

REMARKS

Claims 18 - 22 were previously presented and new claims 23 - 57 are presented for consideration. Claims 18 - 57 are pending in the application.

In view of the following comments, Applicants respectfully request reconsideration and allowance of the application.

Rejections under 35 U.S.C. § 103(a)

Claim 18

Page 3 of the Office Action sets forth a rejection of independent Claim 18 under 35 U.S.C. §103(a) as being unpatentable over the disclosure of EP0462005 to Oigawa in view of the disclosures of U.S. Patent No. 4,897,626 to Fitter and U.S. Patent No. 5,091,666 to Jarczyński. Applicants request reconsideration and withdrawal of this rejection for the following reasons.

Claim 18 is directed to an electric motor having one or more laminations of a metallic material forming an outer casing of the electric motor and one or more circular non-metallic, flat, thermally conductive disks positioned between the laminations for conducting heat generated by an electrical current flowing within the motor through the conductive disks. An electrically conductive material is wound in a plurality of layers within the laminations so as to form an electric field that drives an armature when an electrical current is applied. Thermally conductive strips are interleaved between preselected layers of the electrically conductive material, and the thermally conductive strip extend outside of the area covered by the electrically conductive material. The motor also includes means for conducting heat at the end of the non-metallic thermally conductive disk and the thermally conductive strips, thereby cooling the motor.

The Office Action points to elements 109 of Fig. 6 of Oigawa as corresponding to the claimed "one or more metallic laminations for forming an outer casing of the electric motor", and to Oigawa's coil 101 as corresponding to the claimed "electrically conductive material wound in a plurality of layers within the laminations so as to form an electric field that drives an armature when an electrical current is applied". The Office Action further identifies Oigawa's Figure 6 intermediate radiating plate 110 as

corresponding to both: the circular non-metallic, flat, thermally conductive disks positioned between the laminations for conducting heat generated by an electrical current flowing within the motor through the conductive disks; and the claimed thermally conductive strips interleaved between preselected layers of the electrically conductive material.

The Office Action acknowledges that Oigawa does not disclose that its intermediate radiating plate 110 is non-metallic, as set forth in Claim 18. Indeed, the Oigawa intermediate radiating plate 110 is specifically identified as being made from a magnetic material (col. 6, lines 55-58).

To remedy this deficiency, the Office Action points to col. 2, lines 28-30 of Fitter, which discloses that the heat dissipation elements 40 of the Fitter transformer can be made of a ceramic material or a metal such as copper or aluminum.

The grounds for rejection fail to offer any explanation of why one of ordinary skill in the art would have considered the proposed modification obvious, apart from the unsupported assertion that replacement of the material for the intermediate radiating plates would have been an obvious matter of design choice. The Office Action says only that "It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thermally conductive strips in the stator core or in the windings of a non-metallic material since it has been held to be within the general skill in of a worker in the art to select a material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Lesher, 125 USPQ 416." Therefore, the grounds for rejection fails to contain the elements necessary to establish a prima facie case of obviousness. See, e.g., M.P.E.P. 706.02(j).

The Federal Circuit has held that, under similar facts, that reliance upon an unsupported allegation of "design choice" is insufficient to establish a prima facie case of obviousness. In re Chu, 36 USPQ2d 1089 (Fed. Cir. 1995).

In addition, nothing in Oigawa indicates that the intermediate radiating plate 110 in Fig. 6 is either circular or is a disk. Attention is drawn to Experimental Examples 1 and 5, which describes the iron radiating plates as being 0.5 m thick and 50 x 70 mm

(col. 9, lines 29-35 and col. 12, lines 8-18). Attention is also drawn to Fig. 7 and 8, which illustrate rectangular coil blocks having rectangular coil elements 204 for which “coil element 4, shown in Fig. 3 and/or coil element 104 shown in Fig. 6 can be used” (col. 12, lines 18-20). Thus, the intermediate radiating plate 110 of Oigawa cannot be considered to correspond to the “circular, non-metallic, flat, thermally conductive disks positioned between the laminations for conducting heat generated by an electrical current flowing within the motor through the conductive disks” of Claim 18 for at least this reason. It is noted that the Fitter heat dissipation elements 40, which the Office Action relies upon to remedy the other deficiencies of the Oigawa intermediate radiating plates, are rectangular in shape. Jarczyński also does not disclose circular, non-metallic, flat, thermally conductive disks, thus cannot remedy the Oigawa and Fitter deficiencies. Therefore, the hypothetical combination of Oigawa, Fitter, and Jarczyński as set forth in the Office Action would not have all of the features of the motor set forth in Claim 18.

For at least this additional reason, it is respectfully submitted that the Office Action fails to establish a prima facie case of obviousness for Claim 18.

Applicants therefore respectfully request withdrawal of the rejection of independent Claim 18 and dependent Claim 22.

Claim 19

Pages 2 - 4 of the Office Action set forth a rejection of independent Claim 19 as being obvious under 35 U.S.C. § 103(a) based on the disclosure of Oigawa in view of Fitter. Applicants respectfully request reconsideration and withdrawal of this rejection for at least the following reasons.

Claim 19 is directed to a method for cooling electrical devices having layers of electrically conductive material wound on a core. The method includes placing a non-metallic thermally conductive strip having a first end and a second end, capable of conducting heat from between layers of the electrically conductive material, with the strip extending through at least some of the layers of electrically conductive material wound on the core with both the first end and the second end extending outside of an

area covered by the layers of electrically conductive material. The method also includes conducting the heat from the layers of electrically conductive material through the first and second ends of the non metallic thermally conductive material thereby cooling the electrical device.

As acknowledged by the Office Action, Oigawa fails to disclose both "placing a non-metallic thermally conductive strip having a first end and a second end, capable of conducting heat from between layers of the electrically conductive material" and "the strip extending through at least some of the layers of electrically conductive material wound on the core with both the first end and the second end extending outside of an area covered by the layers of electrically conductive material". To remedy these deficiencies, the Office Action points to Fitter as disclosing a transformer with heat dissipation elements 40 which the Office Action asserts are "non-metallic" and have a first end and a second end which "extend outside of an area covered by the layers of electrically conductive material", as set forth in Claim 19.

The Office Action asserts that one of ordinary skill in the art would have been motivated to modify the method of Oigawa and provide it with the non-metallic strips configuration disclosed by Fitter for the purpose of improving thermal conductivity in the coils. Applicants respectfully disagree.

As an initial matter, Fitter does not illustrate a method for cooling electrical devices having layers of electrically conductive material wound on a core. Fitter does not include a conventional core at all, and also does not disclose layers of electrically conductive material wound on a core. Instead, the windings 16 extend through both of the cylindrical core stacks 30 and 32. The heat dissipation elements 40 appear to be entirely located outside of the area in the interior of the core stacks through which the windings 16 extend. Accordingly, Fitter can provide no guidance for modifying a coil element have a central core and a coil element surrounding the core, such as the coil element of Oigawa Figs. 6 and 7.

Further, although the Office Action asserts that one of ordinary skill in the art would have been motivated to make the proposed modification to improve thermal

conductivity in the coils, nothing in either Fitter or Oigawa indicates that the ceramic material of Fitter's heat dissipation element would provide better thermal conductivity than the magnetic material of the Oigawa radiating plate 110.

In addition, nothing in either Fitter or Oigawa indicates that the ceramic material of Fitter's heat radiation plates 40 would have the magnetic properties Oigawa indicates are necessary for the intermediate radiating plate 110. Fitter specifically states that a non-magnetic material is preferable, and provides copper, aluminum, and ceramic as examples of suitable materials for the heat dissipation plates. See col. 2, lines 24-30.

For at least these reasons, motivation to make the proposed combination cannot be found in either Fitter or Oigawa.

Claim 19 is patentably distinct over the hypothetical combination of Oigawa and Fitter for at least the reasons set forth above. Withdrawal of the rejection of Claim 19 and dependent Claim 20 is respectfully requested.

Claim 21

Independent Claim 21 sets forth a method for cooling an electrical device having layers of electrically conductive material wound on to a laminated core having a heat generating component. The method includes placing one or more non-metallic, flat, thermally conductive strips in contact with the heat generating component across its entire length. The thermally conductive strip extends outside of the area covered by the electrically conductive material and core and is in physical contact with the electrically conductive material. The thermally conductive strip thereby receives heat from the electrically conductive material, and removes heat from a first end and a second end of each of the thermally conductive strips.

It is initially noted that neither Fitter nor Oigawa disclose a core that is "laminated". Further, and as discussed above with respect to Claim 19, neither Fitter nor Oigawa provide any motivation to replace the Oigawa magnetic intermediate radiating plate 110 with a ceramic heat dissipation element 40 of Fitter.

For least these reasons, the Office Action does not establish a prima facie case of obviousness of Claim 21.

New Claims

New dependent Claims 23-28, 29-31, and 32-34 are presented to set forth additional patentable subject matter in claims depending from Claims 18, 19, and 21, respectively. These claims are each allowable for at least the above-mentioned reasons that the independent claims are allowable. Support for the claim language can be found at pages 3-5 of the specification.

New independent claims 35 and 36, and dependent claims 37-57 are presented to set forth additional subject matter to which the Applicants are believed to be entitled. Support for the claim language can be found at least at pages 3-5 of the specification.

Favorable action on new claims 23-57 is therefore respectfully requested.

Conclusion

All of the outstanding matters having been addressed, Applicants request an early indication of the allowability of the application, in the form of a Notice of Allowance.

Should any questions arise with regard to this submission, or with regard to the application in general, the Examiner is cordially invited to contact either of the attorneys listed below.

Respectfully submitted,



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